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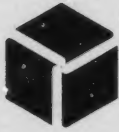
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ABSTRACT

This document suggests to state postsecondary education agencies and other organizations concerned with postsecondary educational planning and management a possible state-level information structure that incorporates the National Center for Higher Education Management Systems (NCHEMS) Program Classification Structure (PCS). It provides some specific suggestions concerning how such agencies might aggregate institutional data presented in PCS format for various purposes, and in this context it touches on the sensitive question of the level of details at which data are required for statewide planning and management efforts. (MJM)

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- ... to help universities and colleges improve both their programs and their management.
- ... to inform the public about the needs of higher education.

The Program of the National Center for Higher Education Management Systems at WICHE was proposed by state coordinating agencies and colleges and universities in the West to be under the aegis of the Western Interstate Commission for Higher Education. The National Center for Higher Education Management Systems at WICHE proposes in summary:

To design, develop, and encourage the implementation of management information systems and data bases including common data elements in institutions and agencies of higher education that will:

- provide improved information to higher education administration at all levels.
- facilitate exchange of comparable data among institutions.
- facilitate reporting of comparable information at the state and national levels.

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AN EXAMINATION OF POSSIBLE STATEWIDE APPLICATIONS
AND EXTENSIONS OF THE NCHEMS PROGRAM CLASSIFICATION STRUCTURE

Technical Report No. 50

Paul Wing
Leonard Romney

October 1974

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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PREFACE

The primary mission of the National Center for Higher Education Management Systems (NCHEMS) at WICHE is to assist organizations and agencies concerned with postsecondary education in the development of improved procedures and tools for resource allocation and management. A related objective is the development of procedures that facilitate the exchange of comparable data among these institutions and agencies. This document, which has been developed jointly by the NCHEMS staff and the Statewide Structures Task Force, reviewed by the staff, the Task Force, and panel of outside reviewers, and approved for release to the entire NCHEMS mailing list by the NCHEMS Board of Directors, is intended to further these general objectives.

The primary objective of this document is to suggest to state postsecondary education agencies and other organizations concerned with postsecondary education planning and management a possible state-level information structure that incorporates the NCHEMS Program Classification Structure (PCS). It provides some specific suggestions concerning how such agencies might aggregate institutional data presented in PCS format for various purposes, and, in this context, it touches on the sensitive question of the level of detail at which data are required for statewide planning and management efforts. It should not be construed as a statement of policy by NCHEMS regarding either the necessity or desirability of using the PCS as a portion of a state-level information structure.

Readers are encouraged to consider the suggestions in this document as examples of the kinds of things that might be done. The specific solutions chosen by individual organizations should be developed after careful consideration of the problems that must be dealt with and the circumstances that surround them. Ideally, all the institutions and agencies involved and affected by such a structure should be involved in the development process.

The definitions of institutional characteristics included in the section entitled "Institutional Characteristics of Possible Interest at the State Level" coincide with definitions currently provided in the NCHEMS Statewide Measures Inventory. In all cases, the Statewide Measures Inventory, which will be updated as appropriate in the future, is the authoritative source for the definitions.

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INTRODUCTION

Three important elements of any planning and management system are *information* about the programs and activities of interest, *structures* for organizing and displaying the information, and *procedures* for collecting and analyzing the information. As an organization devoted to the improvement of planning and management for postsecondary education, the National Center for Higher Education Management Systems (NCHEMS) has focused much effort on identifying, developing, and implementing these kinds of information, structures, and procedures for the postsecondary education community, with an emphasis on the planning and management needs of higher education institutions.

Although it is important that higher education institutions be able to deal effectively with their planning and management problems, other organizations also are seeking assistance in this area, including a variety of state agencies. Consequently, this document is aimed primarily at state-level agencies concerned with postsecondary education planning and management, although it is anticipated that other organizations concerned with more than one postsecondary education institution, such as the central offices of multicampus institutions and informal consortia of independent institutions, will find the document relevant. In addition, an attempt has been made to indicate some of the potential benefits to individual institutions from the kinds of data aggregations that can be obtained by use of the suggested procedures.

Since the NCHEMS Program Classification Structure (PCS) is widely used as a structure for organizing information about the programs of higher education institutions, and since institutional data are an important part of the total information needs of state postsecondary education agencies, the PCS deserves serious consideration as a *partial* basis for a statewide classification structure for postsecondary education. It must be emphasized that because it does not deal with information from outside educational institutions (for example, demographic information), the PCS cannot serve as the sole basis for a total statewide postsecondary education information system. However, it can serve as the basis for that portion of the total information system concerned with the programs of institutions.

This document will explore some of the possible applications of the PCS in organizing information about postsecondary education programs for planning and management purposes at the state level. It also will discuss some of the implications and consequences of using the PCS as a basis for collecting institutional data for state-level use.

THE NCHEMS PROGRAM CLASSIFICATION STRUCTURE

Since this paper refers to the NCHEMS Program Classification Structure in a number of contexts, it is appropriate to provide an introduction to the PCS as a basis for the subsequent discussion. Although the essential features of the PCS are discussed in the following paragraphs, readers should refer to the Program Classification Structure (Gulko, 1972) for a complete description and enumeration of its components.

The introductory paragraphs of the PCS document indicate that:

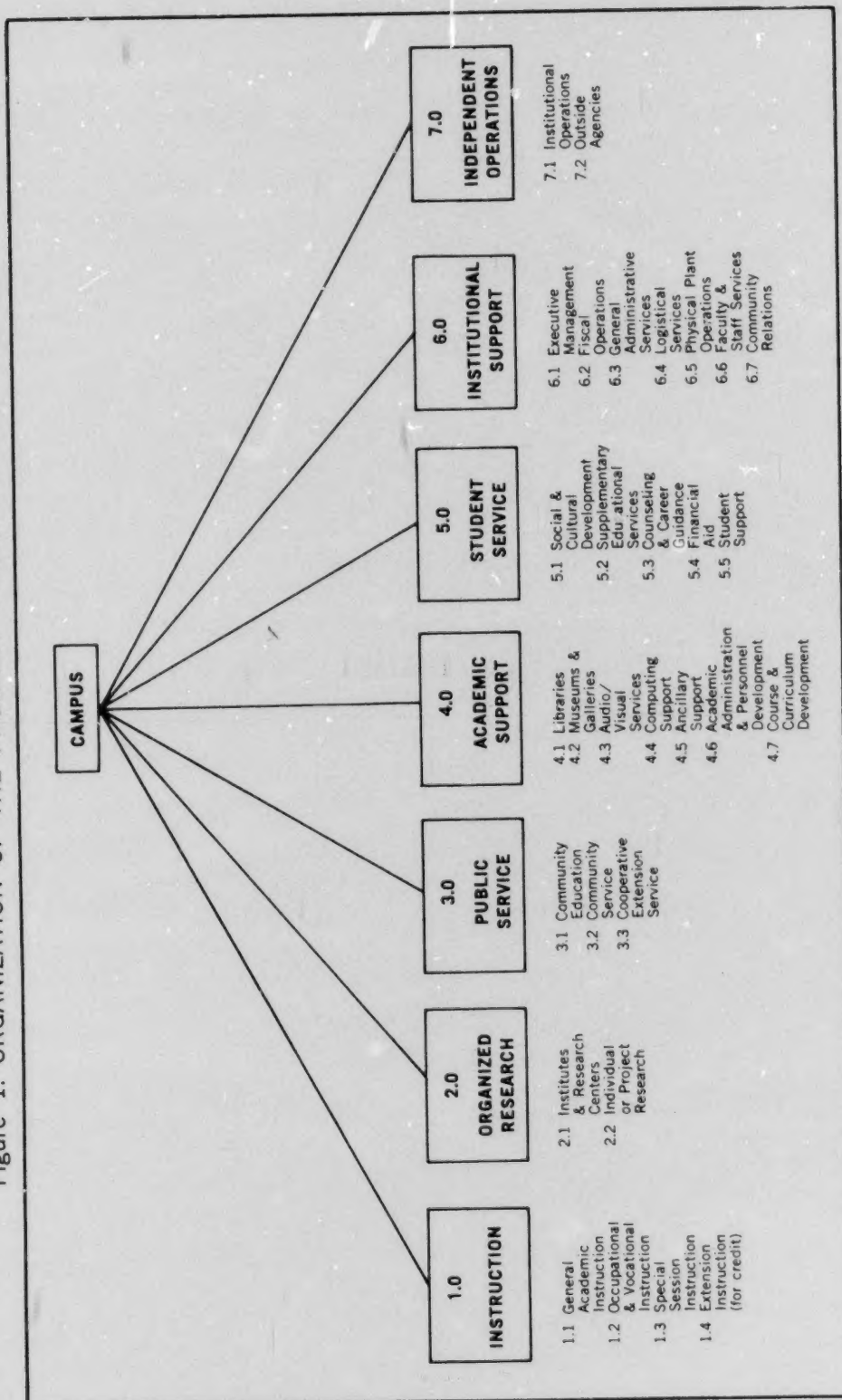
- The PCS is a standard framework for organizing information about the programs of higher education. *Program* is defined as the "stratum in the PCS hierarchy representing the collection of program elements serving a common set of objectives that reflect the major institutional missions and related support objectives," where *program element* is defined as "the smallest unique collection of managed resources that are output producing activities" (Gulko, 1972: p. 120).
- The PCS is not an organizational structure nor a new chart of accounts, nor is it a replacement for existing data systems for institutions of higher education.
- The PCS is intended primarily as an information organizing structure that facilitates comparisons of current and historical data in a program-oriented manner.
- The PCS is the program structure used by a number of other NCHEMS products that define measures and describe procedures pertaining to different kinds of information that are useful for higher education planning and management; for example, Program Measures (Topping and Miyataki, 1973), Cost Analysis Manual (Topping, 1974), Information Exchange Procedures Manual (Renkiewicz and Topping, 1973), Facilities Inventory and Classification Manual (Romney, 1972), Higher Education

Finance Manual (Collier, 1974), and Manpower Resources in Postsecondary Education (Jones, 1974: in process).

The basic structure of the PCS, which describes a single campus, is hierarchical as indicated in Figure 1. Information about the campus is successively disaggregated into major program areas (for example, 1.0--Instruction) and other more detailed subcategories. The entire structure (Figure 2) has six levels ranging from major programs down to individual program elements. The PCS includes support programs such as Academic Support (4.0) and Institutional Support (6.0) as well as the three primary programs, Instruction (1.0), Organized Research (2.0), and Public Service (3.0).

To facilitate the use of the PCS as a standard framework for organizing and arraying institutional information in a comparable way, a specific coding structure has been established, as illustrated in Figure 3. This coding structure and the corresponding definitions for the specific programs, categories, and sectors are the essence of the PCS. The first eight digits of this sixteen-digit code correspond to the first five levels of the Program Classification Structure (major program through program sector), as shown in Figure 2. The last eight digits, six for the program element (the sixth level of the PCS) and two unassigned, have not been given standard definitions and code numbers so that individual institutions can develop their own definitions for these more detailed categories in the structure.

Figure 1. ORGANIZATION OF THE PROGRAM CLASSIFICATION STRUCTURE



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Figure 2. PROGRAM CLASSIFICATION STRUCTURE NOMENCLATURE

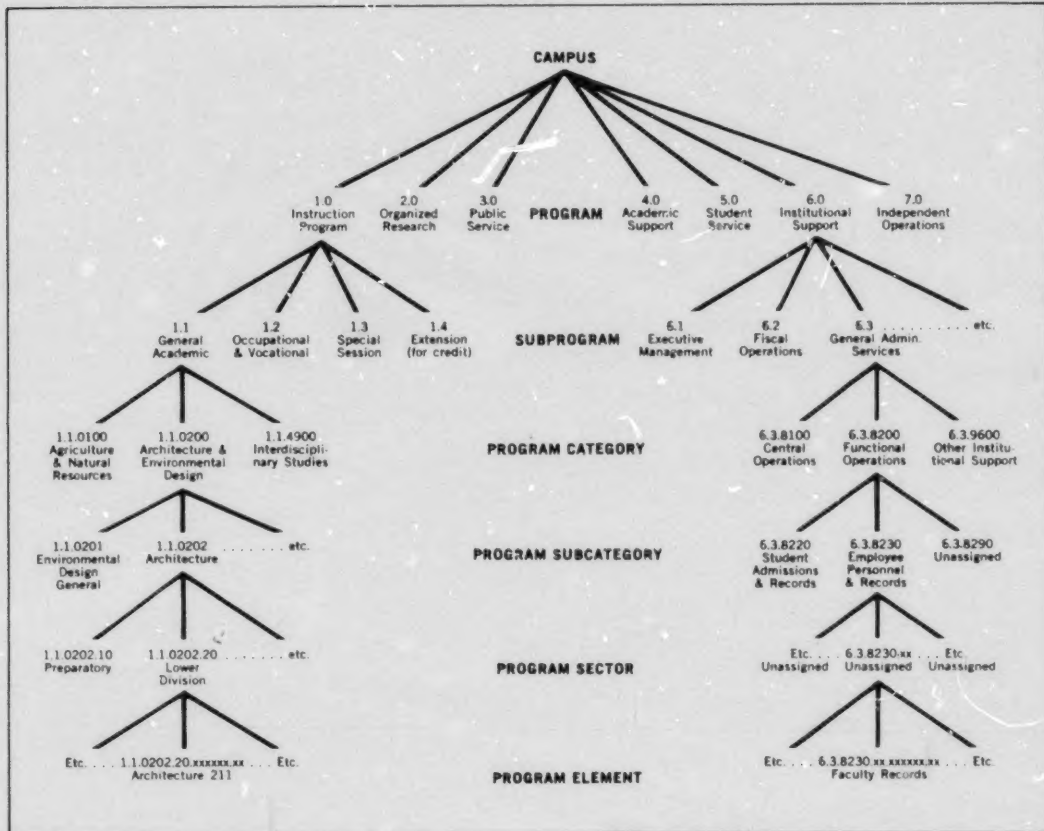
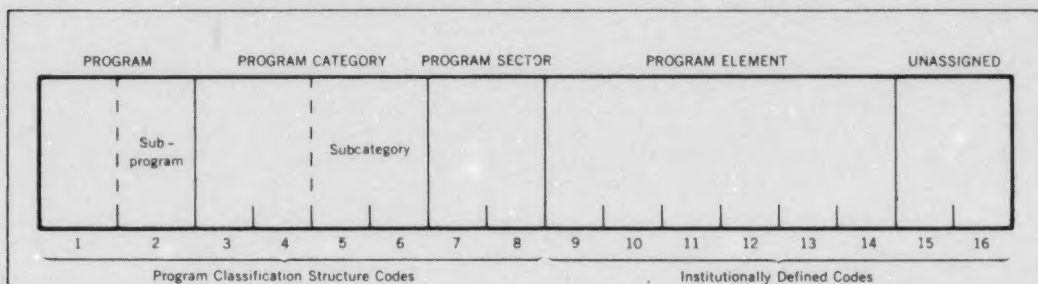


Figure 3. SIXTEEN-DIGIT CODING STRUCTURE



Because this document suggests a number of possible uses of the PCS in a state-level information classification structure, it is important to emphasize some characteristics of the PCS and the assumptions upon which it was created.

- The portions of the PCS pertaining to instructional activities describe institutional/discipline programs, not student/degree programs. This is particularly evident in 1.0--Instruction, where disciplines rather than student programs constitute the program categories. The Taxonomy of Instructional Programs in Higher Education (Huff and Chandler, 1970), which defines the program categories and subcategories of the PCS, is used to identify subject matter areas rather than instructional curricula. Thus, for example, General Academic Instruction in Urban Architecture (1.1.0205.xx) describes an institutional program or discipline rather than a student program or degree curriculum. This distinction will be developed more fully later in this section.
- The PCS is an organizing structure designed originally for higher education institutions. Recent federal legislation has recognized a broader concept of postsecondary education that includes "noncollegiate" as well as "collegiate" institutions. Although the PCS may be adequate for describing many postsecondary education activities, there has been no substantive effort devoted to determining the extent of its applicability in this broader context.

- The PCS is a hierarchical structure that can be used to aggregate information from specific, detailed elements of the structure to broad general categories. It is important to note, however, that the principle of hierarchical aggregation within the PCS must not be adopted uncritically; one must consider carefully what implications reside in the resulting aggregations. For example, normally one cannot compute the number of students enrolled at a campus by simply aggregating all the course enrollment figures for that campus. Because each student typically enrolls in a number of courses in any given term, simple aggregations of course enrollments would lead to multiple counting of students. Of course, if "total campus course enrollments" is the statistic of interest, then a straightforward aggregation is appropriate.
- Finally, just as a filing system takes on meaning only when the file folders are filled with correspondence and memoranda, the PCS assumes meaning only when specific kinds of information are attached to its elements. Meaningful comparisons of different institutional programs cannot be based solely on the names of those activities, but must rest on the values of key descriptors of the programs. For example, to compare upper division instruction in Anthropology in two institutions, one needs such descriptive information as enrollments, the number of faculty involved, the number of dollars spent, the outcomes achieved, and so forth for both programs. These descriptors of the various activities and organizational units defined by the PCS are called program measures.

Program measures are defined as "quantitative indicators of the resources utilized, the activity levels generated, the groups that were served and benefited, the expenditures incurred, the revenues generated, and the outcomes achieved by the program and program elements" of the PCS (Topping and Miyataki, 1973: p. 5). Six categories of program measures covering the target groups, beneficiary groups, activities, resources, finances, and outcomes of the different PCS programs have been identified and discussed in detail. Figure 4 indicates how the program measures are related to the PCS categories.

INSTITUTIONAL/DISCIPLINE PROGRAMS VERSUS STUDENT/DEGREE PROGRAMS

As indicated above, the PCS describes institutional/discipline programs, not student/degree programs. Since state agencies as well as institutions may face important decisions concerning both types of programs, it is important to understand both the differences and the linkages between them.

The basic difference between institutional/discipline programs and student/degree programs is one of perspective. Institutions define their programs in terms of the disciplines for which they provide educational services, and these disciplines typically correspond to organizational units such as academic departments. Students, on the other hand, define their programs (that is, construct their curricula and/or select their courses) in terms of the offerings of several institutional/discipline programs in order to fulfill the requirements for a particular degree, certificate, or other indicator of completion. Thus, the institutional physics program,

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Figure 4. GENERAL FRAMEWORK OF PROGRAM MEASURES

PCS PROGRAM	PROGRAM MEASURES					Activities	Outcomes
	Resources	Finances	Beneficiary Groups	Target Groups			
Instruction							
Organized Research							
Public Service							
Academic Support							
Student Service							
Institutional Support							
Independent Operations							

consisting of the courses, research projects, and so forth of the physics department, is conceptually different from the student physics program, which might include courses in mathematics, chemistry, English, and so forth as well as in physics.

It is interesting to note that the instructional portions of both institutional/discipline programs and student/degree programs have individual courses as common elements. When a student in a particular degree program takes a course in a particular discipline, the two dimensions become linked together. This linkage is discussed in more detail in the Appendix to this document.

It should be emphasized that both kinds of programs are important and should be given serious consideration by postsecondary education planners and decision makers. The relative emphasis that each receives in planning and management processes should be determined in light of the specific problems and decisions at hand. However, because this document is concerned with direct extensions of the PCS, it deals with institutional/discipline categories and does not explore extensions to student/degree program categories beyond the general remarks in this section and in the Appendix.

POSSIBLE STATEWIDE EXTENSIONS AND APPLICATIONS OF THE PCS

Given a specific set of planning and decision-making responsibilities, a state agency must answer a number of fundamental questions related to information about the postsecondary education programs and institutions within its purview:

- What data are required to fulfill the specific state-level planning and decision-making responsibilities?
- What are the appropriate sources for these data?
- How should the data be organized?

The answers to these questions depend largely on the kinds of responsibilities granted to the state agency, its operating style, and the kinds of postsecondary education programs and institutions being operated within the state. Because the Program Classification Structure was developed by and for higher education institutions, and because the related program measures describe a variety of aspects of the programs of higher education institutions, a significant portion of a statewide postsecondary education classification structure could be based on the PCS and the related program measures. However, any consideration of the PCS as an element of a statewide information structure must recognize the limitations of the PCS. Information on student/degree programs, for example, could not be supplied directly by the PCS (although the Taxonomy of Instructional Programs in Higher Education used in the PCS can be used to categorize student/degree programs as well as institutional/discipline programs). Information from sources other than institutions would require supplementary classification structures also.

In the following discussion it is assumed that the institutions in the state that are of interest to a state agency have implemented the PCS and can provide data in the PCS format. This is essential to the procedures suggested below.

A GENERAL FRAME OF REFERENCE

Currently, one of the few ways of evaluating postsecondary education programs and institutions at the state level is comparing them with other programs and institutions. Such comparisons can provide important insights into such program measures as the resources required relative to the outcomes produced, attractiveness to students, and job placement of graduates, which can be applied both in coordinating current activities and in planning for the future.

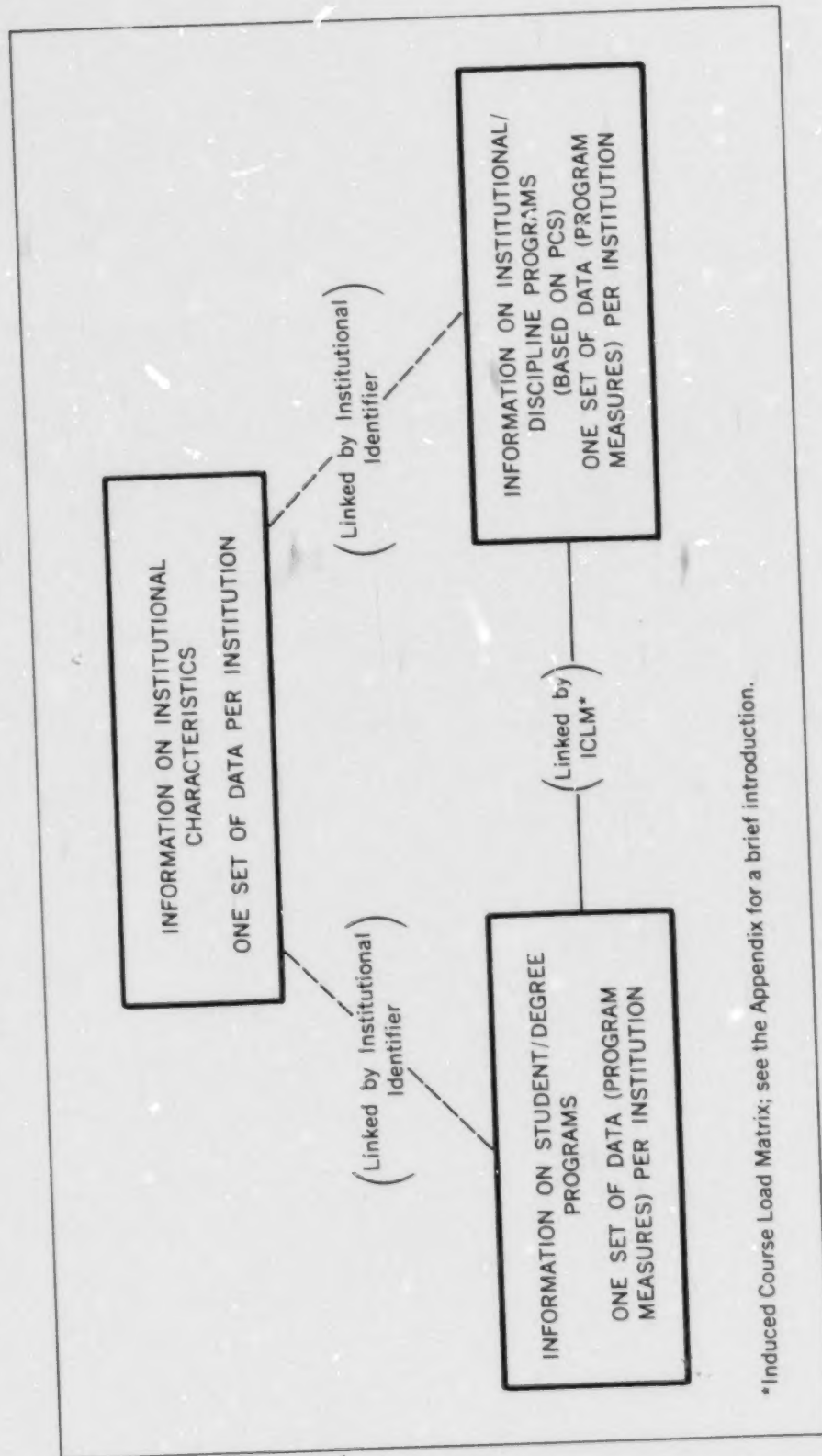
Although the PCS and associated program measures provide a comprehensive system for classifying and describing the discipline programs of higher education institutions, these do not by themselves provide a sufficient basis for making interinstitutional comparisons of the discipline programs. Also required for this task is a standard way of describing the characteristics of the institutions that may have an impact on the program measures being compared. For example, the observation that the cost per credit hour in a particular discipline program is substantially higher at one institution than at another would leave unexplained the reason for the difference. Because the difference might be attributable to characteristics of the institutions in question (such as their size, type, or geographic location), it is appropriate to develop a standard way of describing and classifying institutions.

In an operational sense, this suggests organizing supplementary information on institution characteristics into sets or files, as illustrated in Figure 5. These sets of institutional characteristics then can be linked to information on institutional/discipline programs (in the PCS format) by an institutional identifier code so that both kinds of information can be brought together easily to permit analyses.

Although institutional characteristics and institutional/discipline programs are important elements of any system for classifying information about postsecondary education institutions, they do not represent a complete frame of reference. Information on student/degree programs is required also. It is beyond the scope of this document to suggest a specific format or classification structure for information about student/degree programs, but Figure 5 indicates schematically how this kind of information can be incorporated into a unified frame of reference.

With this general frame of reference as a backdrop, it is appropriate to consider some of the institutional characteristics that might be of interest to state level postsecondary education planners and decision makers. In the discussion that follows emphasis is placed on how these institutional characteristics can be related to information on institutional/discipline programs classified according to the PCS format.

Figure 5. A GENERAL FRAME OF REFERENCE FOR STATEWIDE APPLICATIONS OF THE NCHEMS PROGRAM CLASSIFICATION STRUCTURE



*Induced Course Load Matrix; see the Appendix for a brief introduction.

INSTITUTIONAL CHARACTERISTICS OF POSSIBLE INTEREST AT THE STATE LEVEL

There are a large number of characteristics that describe various aspects of postsecondary education institutions. The six discussed below have been identified by the project staff and Task Force as likely to be relevant and interesting to a large number of state agencies. Readers should not feel compelled to use only the six characteristics discussed here; rather, they should include in their files those characteristics most relevant to the specific comparisons and decisions with which they must deal.

Specific categories have been included for four of the six characteristics in the hope that they will prove useful as standards for exchange and reporting purposes. Moreover, an attempt has been made to ensure that the specific definitions for the categories are consistent with definitions in current use nationally. In some cases (for example, type of institution), the project staff and Task Force believe that currently available definitions either are inadequate or emphasize distinctions that are not appropriate in a postsecondary education context (for example, collegiate/noncollegiate). In these cases, new definitions have been developed in conjunction with the NCHEMS Statewide Measures project. It is hoped these new definitions will better meet the needs of the postsecondary education community than do the alternatives currently available. (The NCHEMS Statewide Measures Inventory [McLaughlin, Wing, and Allman, 1974] is in all cases the authoritative source for definitions.)

1. Type of Organization or Institution

This category is probably of considerable interest to state-level planners and decision makers. Unfortunately, it sometimes involves difficulties in identifying the best category in which to place certain institutions. The list below is taken from the NCHEMS State-wide Measures Inventory (McLaughlin, Wing, and Allman, 1974) which is based in part on classifications developed by the National Commission on the Financing of Postsecondary Education (1973), the Academy for Educational Development (1973), and the National Center for Educational Statistics (1973):

A. Postsecondary Education Institution--Includes any institution for which education (encompassing instruction, public service, and research) offered to individuals who have completed secondary education or who are beyond the compulsory school attendance age is the *primary* objective:

(1) Doctoral-Granting Universities--Institutions which offered a wide range of doctoral, master's, and baccalaureate programs in a specified fiscal year.

(a) Major Research Universities--Universities which awarded over fifty doctor's degrees and that received over ten million dollars in federal government support of the academic sciences in the specified fiscal year.

- (b) Other Research Universities--Those universities which awarded over thirty doctor's degrees and that received over five million dollars in federal government support of the academic sciences in the specified fiscal year.
- (c) Other Doctoral-Granting Universities--All other universities which awarded any doctoral degrees in the specified fiscal year.
- (2) Comprehensive Colleges and Universities--Institutions which in a specified fiscal year offered and awarded baccalaureate and master's degrees, but awarded no doctoral degrees (even though doctoral programs may have been available).
- (3) General Baccalaureate Colleges--Institutions having no doctoral programs which in a specified fiscal year offered and awarded baccalaureate degrees, but awarded no master's degrees (even though master's programs may have been available).
- (4) Separate Specialized Professional Schools--Institutions which offered programs in one or more related professional areas at least at the baccalaureate level in a specified fiscal year.

- (a) Divinity Schools
 - (b) Medical Schools and Centers
 - (c) Other Health Professions Schools (Dentistry, Optometry, Osteopathy, Podiatry, Veterinary Medicine, Nursing, Public Health, Pharmacy, Chiropractic Medicine, and Professional Psychology)
 - (d) Schools of Engineering and Technology
 - (e) Schools of Business and Management
 - (f) Schools of Art, Music, and Design
 - (g) Schools of Law
 - (h) Teachers Colleges
 - (i) Other Specialized Institutions and Centers (for example, graduate centers, military academies, miscellaneous specialized kinds of institutions, etc.)
- (5) Community/Junior Colleges--Institutions which offered academic and vocational/technical programs at less than the baccalaureate level in a specified fiscal year.
- (a) Comprehensive Community Colleges--Institutions which offered a wide range of academic, vocational, and adult/continuing education programs.
 - (b) Academic Junior Colleges--Institutions which primarily offered academic programs, and possibly a few vocational/technical programs, generally but not exclusively for transfer credit into baccalaureate programs in other institutions.

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- (6) Comprehensive Vocational/Technical Schools--Institutions which offered a wide range of occupational education programs, and possibly a few academic programs, generally at less than the baccalaureate level in a specified fiscal year.
- (7) Specialized Vocational/Technical Schools--Institutions which offered either a single occupational education program or a set of closely related occupational programs generally at less than the baccalaureate level in a specified fiscal year.
- (a) Technical Institutes--Institutions which offered instruction in one or more of the technologies at a level below the professional level and above the skilled trades.
- (b) Business/Commercial Schools--Institutions which offered programs for business occupations (for example, secretarial, data processing, accounting, etc.).
- (c) Cosmetology Schools--Institutions which offered programs in beauty treatments (for example, care and beautification of hair, complexion, hands, etc.).
- (d) Flight Schools--Institutions which offered programs for training in technical fields related to aviation (for example, aircraft mechanic, pilot, etc.).

- (e) Trade Schools--Institutions which offered programs in one or more trades (for example, auto mechanics, bartending, locksmithing, etc.).
- (f) Health Care Schools--Institutions which offered programs in one or more of the medical or paramedical occupations. Many of these institutions are affiliated with some health care delivery organization such as a hospital, clinic, or sanatorium.
- (g) Recreation Schools--Institutions which offered programs in recreational subject matter areas (for example, mountain climbing, boating, arts and crafts, etc.).
- (h) Foreign Language Schools--Institutions which offered programs in one or more foreign languages.
- (i) Real Estate Schools--Institutions which offered programs concerned with real estate (for example, selling techniques, property assessment, real estate financing, etc.).
- (j) Other, Specify--Schools or institutions not classified in any of the above groups (for example, Job Corps centers, correctional institutions, vocational rehabilitation schools, schools for the handicapped or retarded, etc.).

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- B. Other Learning Centers--Includes any institution for which education (encompassing instruction, public service, and research) offered to individuals who have completed secondary education or who are beyond the compulsory school attendance age is a *secondary* objective (for example, churches, YMCAs, YWCAs, city recreation programs, secondary schools, libraries, museums, hospitals, art galleries, labor unions, public radio and television, civic organizations, industrial organizations, military organizations, professional associations, chambers of commerce, agricultural experiment stations, federal research centers, zoos, theatres, concert halls, botanical gardens, historical monuments, etc.).

2. Legal Identity

Classes of ownership, particularly as they relate to control of policy, also are particularly relevant to state-level planners and decision makers. The following categories are recommended:

- A. Public--Control of policy originates directly or indirectly from a constitutionally defined form of government.

- (1) Federal Government
- (2) State Government
- (3) Political Subdivision (for example, municipality)
- (4) State and Local Government (shared)
- (5) Federal and State Government (shared)

B. Private--Control of policy originates primarily from a nongovernmental agency.

- (1) Independent nonprofit group or organization
- (2) Church related or affiliated
- (3) Proprietary (profit making or seeking--tax paying)

3. Geographic Location

Since the geographic location of an institution or campus may relate to program costs, audiences served, and so forth, it should be considered for inclusion in the files of institutional characteristics. While there are a large number of possible bases that might be used to define the regions, the most convenient starting point for most purposes is existing political subdivisions such as counties, townships, SMSAs, and postsecondary education districts. It may be appropriate for some purposes to establish clusters of these political subdivisions (or some other geographic units such as census tracts) based on characteristics of the population or society within the geographic units such as population growth and movements, labor supply and demand, transportation and communication, and/or income and expenditures.

4. Target Population

The target population for a postsecondary education institution or program is that segment of the population of the state or nation that the institution has been formally designated to serve or that the institution has informally chosen to serve. For institutions

such as community colleges that may have difficulty identifying a single target population or may have different target audiences for different programs, it may be necessary to abandon target population as an institutional characteristic and deal with it as a program or curriculum characteristic. In cases like this, it also may be possible to define several target population categories based on combinations of population characteristics into which institutions can be categorized. Some of the population characteristics that can be used to define target populations are geographic location, age group, ability levels, and socioeconomic status.

5. Size of Campus

Because size of institution may have a significant impact on both costs and educational impacts of postsecondary education institutions, it deserves consideration as a formal institutional descriptor. Although it is easy to keep the actual enrollment levels for institutions, it may be convenient for some purposes to use size categories. The following categories based on headcount enrollments are recommended:

- A. Fewer than 250 students
- B. 250 to 499 students
- C. 500 to 999 students
- D. 1,000 to 2,499 students
- E. 2,500 to 4,999 students
- F. 5,000 to 9,999 students
- G. 10,000 to 19,999 students
- H. 20,000 or more students

6. Campus Structure

Organizational structure and governance patterns also may have an impact on institutional activities, performance, and resource utilization patterns. Recommended categories for this characteristic based on Information Exchange Procedures (Renkiewicz and Topping, 1973) are:

- A. Single-Campus Institution--A structure having only one campus.
- B. Main Campus of an Institution with a Main Campus Plus Branch(es) and/or Extension(s)--The parent campus of an institution consisting of one parent campus plus any number of branch campuses or extension centers.
- C. Branch or Extension of an Institution with a Main Campus Plus Branch(es) and/or Extension(s)--One of the branch campuses or extension centers of an institution consisting of one parent campus plus any number of branch campuses or extension centers.
- D. One Campus of a Multicampus System--One of the campuses of an institution consisting of several administratively equal campuses often controlled by one central office.
- E. Other Campus Structure--This category should be used for other structures not accounted for in the above distinctions. If this category is used, briefly explain the structure.

In states that have several multicampus systems or other organized groups of institutions (for example, a consortium of private colleges)

it might be appropriate to add a code number to identify the system or group, if any, to which each institution belongs. This code would facilitate the development of systemwide totals which might be of interest to a state agency concerned with coordinating the programs of these systems and groups.

These six institutional characteristics by no means exhaust all the possibilities; however, when reviewing a large set of possibilities the project staff and Task Force believed that these six were more likely to be of interest in a larger number of state agencies than the others considered. Among those considered but omitted from the final set were such characteristics as Method of Instruction (for example, face-to-face versus correspondence), Faculty Labor Union Status, Sexual Orientation (for example, coed school, men's school, women's school), and eligibility for federal aid (which is sometimes used to classify proprietary schools). A state agency naturally is free to include these and any other characteristics that it deems relevant to its planning and management responsibilities in its files of institutional characteristics.

One additional item, a campus identification code, is required to make the necessary linkages between the institutional characteristics file and the institutional/discipline program files (that is, the PCS) as shown in Figure 5. Some institutions already have been assigned unique identifying numbers by the federal government (for example, higher education institutions are assigned FICE code numbers by the Federal Interagency Committee on Education) and where possible these numbers should be retained. However,

if a state agency were interested in the full range of postsecondary education opportunities in a state as exemplified in the list of types of institutions described previously, a new or expanded coding scheme undoubtedly would be required.

APPLICATIONS OF THESE INSTITUTIONAL CHARACTERISTICS

It is impossible to explore this subject exhaustively in this document, but the pages that follow suggest and illustrate an approach to the development of statewide extensions to the Program Classification Structure, referred to as superstructures. Two general approaches are explored: One is to use some or all of the institutional characteristics discussed above to describe explicitly the institutions from which data in the PCS format are obtained. They can serve as a partial basis for estimating which institutional characteristics, if any, are important in explaining why different data (for example, cost per degree) are obtained from different institutions. The second approach, which actually is a special case of the first, involves the use of those one, two, or possibly three of the institutional characteristics that a state agency deems most important as the basis for a hierarchical extension of the PCS. These alternatives will be discussed in turn below.

Superstructures to Facilitate Interinstitutional Comparisons

Assuming that a state agency could obtain from the institutions for which it is responsible all the data that it requires, the agency still must address the problem of interpreting the data and applying them to planning and decision making. Clearly, a simple enumeration of the kinds of institutional characteristics described above will not

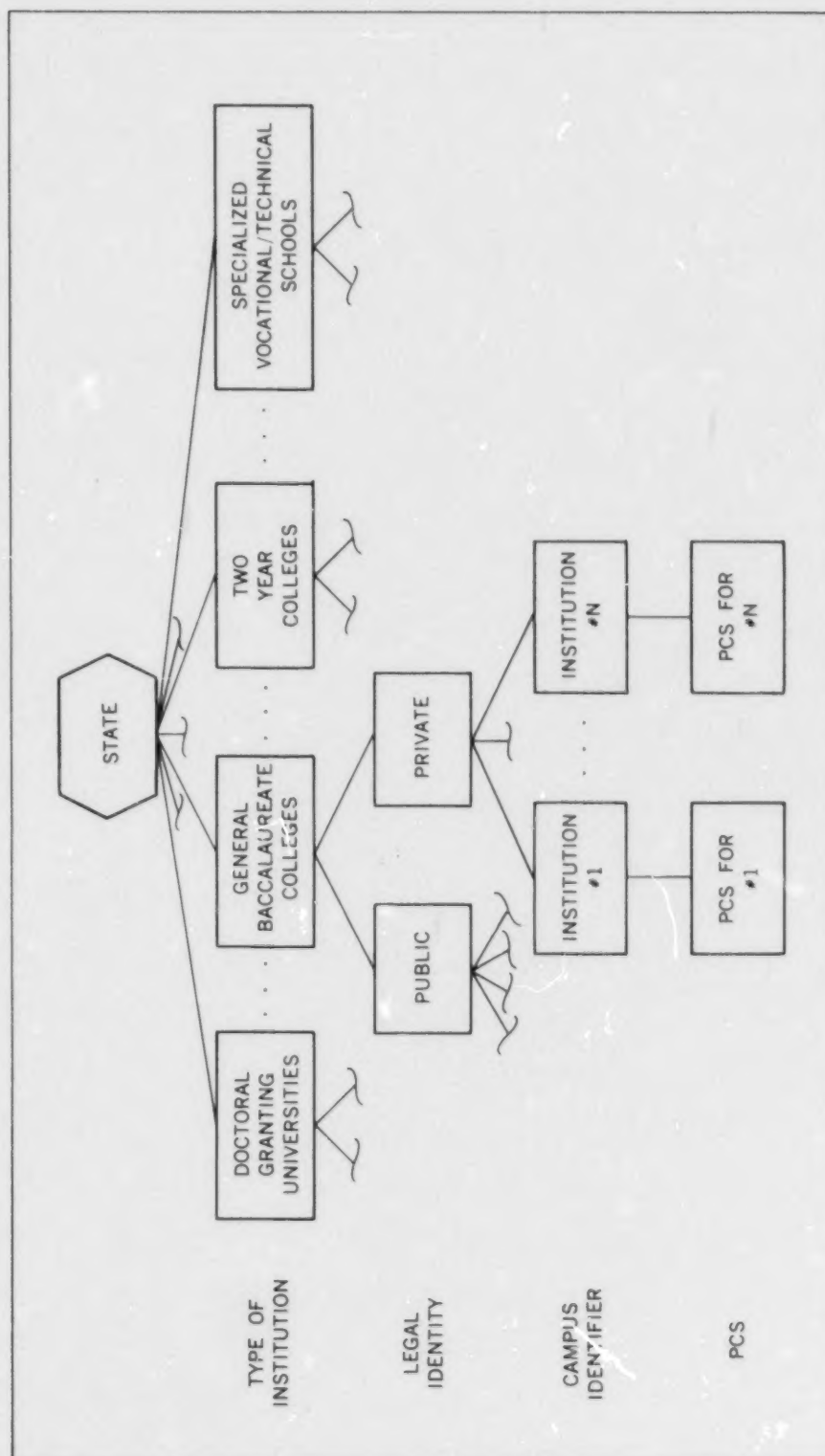
begin to answer these important questions. However, because comparative statistics on programs and institutions are at least a partial basis for developing the kinds of understandings of alternative policies and plans required for informed decision making, these characteristics can yield important insights for planners and policy makers.

For example, one could tag some or all data from each institution in a state with a set of coding digits corresponding to the specific categories of the institutional characteristics described above. The resulting superstructure of institutional characteristics then could serve as a basis for analyzing the relative importance of different characteristics on such institutional data as costs per FTE student. This superstructure also would facilitate a wide variety of aggregations of institutional data of interest to statewide and institutional planners and analysts. For example, one could aggregate data from the institutions in a state on such characteristics as enrollments, expenditures, and degrees awarded into categories based on the codes in the superstructure. These aggregations then could be analyzed in ways similar to those for totals for individual institutions, or they could be used to support statewide planning and budgeting processes.

Hierarchical Superstructures for the PCS

It is theoretically possible to develop a superstructure for the PCS involving all of the institutional characteristics described above in a hierarchical way (that is, in a way such that successively higher levels in the structure involve aggregations of all the lower levels in the structure). However, this probably is not a practical alternative

Figure 6. ONE POSSIBLE HIERARCHICAL INFORMATION
STRUCTURE INCORPORATING THE PCS



because the number of different combinations of the six institutional characteristics is unmanageably large. Therefore, if a statewide agency were interested in a hierarchical superstructure for the PCS based on these kinds of characteristics, it would be best to consider using only that set of characteristics which seem most relevant to its planning and decision-making responsibilities.

For example, if a statewide agency determined that of the institutional characteristics enumerated above only "type of institution" and "legal identity" were of particular relevance to its decision-making concerns, it could use the hierarchical superstructure for the PCS shown in Figure 6.

A coding scheme for this statewide superstructure is illustrated in Figure 7.

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Figure 7. POSSIBLE CODING FORMAT FOR THE INFORMATION
STRUCTURE ILLUSTRATED IN FIGURE 6

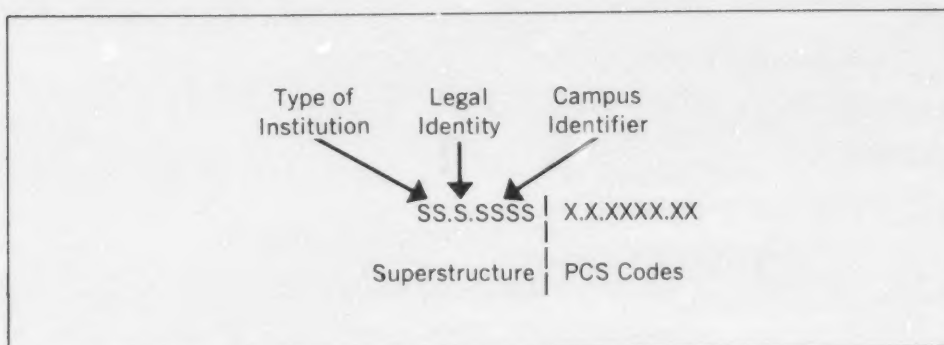
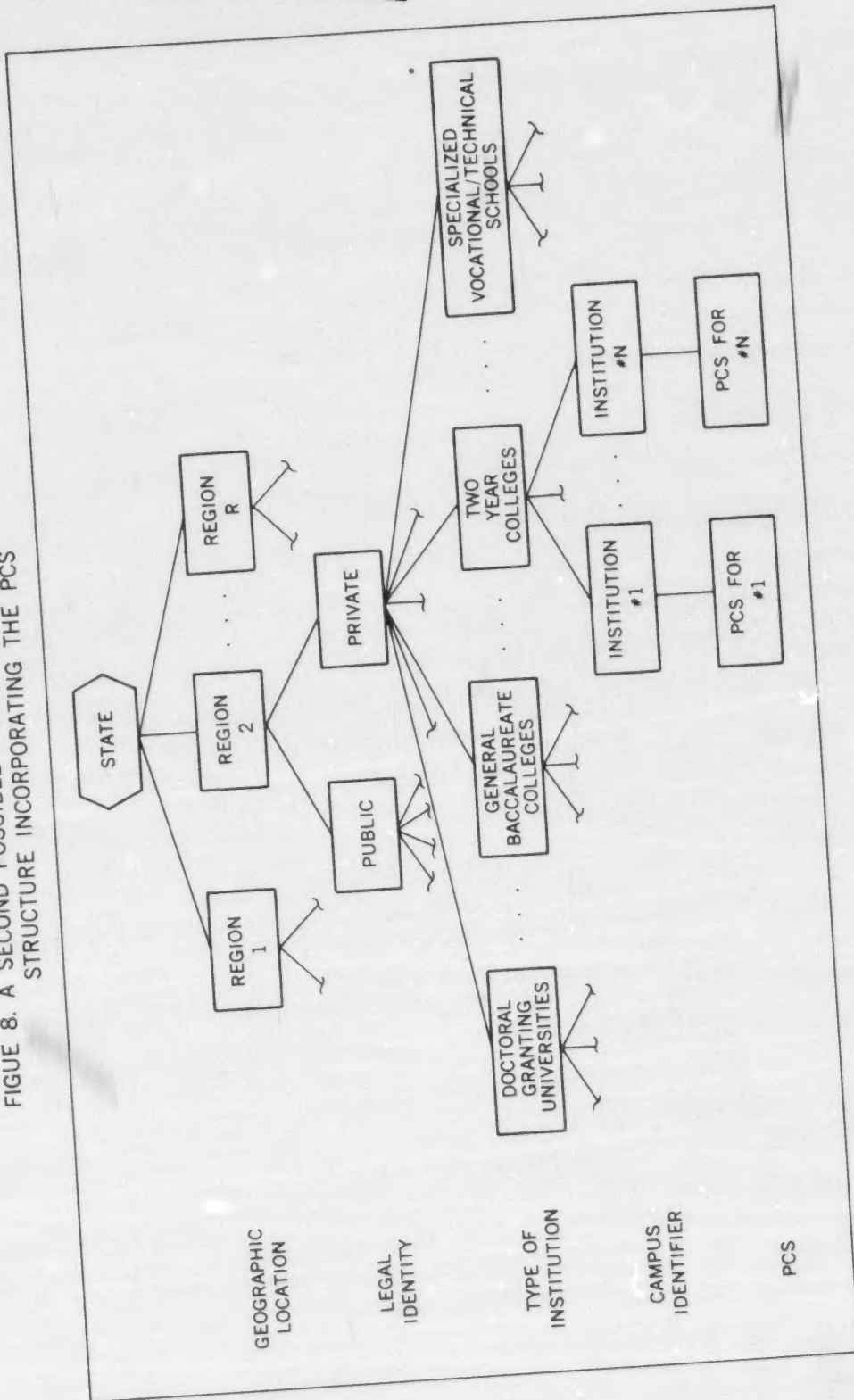
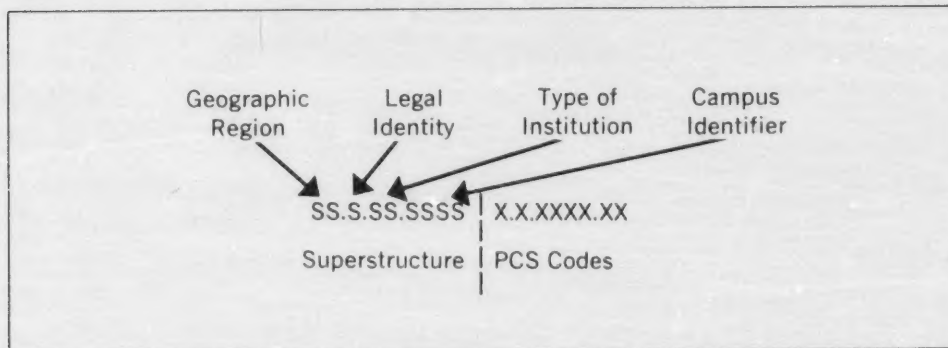


FIGURE 8. A SECOND POSSIBLE HIERARCHICAL INFORMATION
STRUCTURE INCORPORATING THE PCS



Although the statewide superstructure shown in Figure 6 may be useful to state agencies in a number of planning and management contexts, there may be others that would be more appropriate in other situations or other states. For example, if the geographic dispersion of postsecondary education opportunities were an important issue in a state, consideration might be given to including geographic location as one of the characteristics in

Figure 9. POSSIBLE CODING FORMAT FOR THE INFORMATION STRUCTURE ILLUSTRATED IN FIGURE 8



the structure as shown in Figure 8. Figure 9 depicts a possible coding scheme for such a superstructure including geographic location, legal identity, and type of institution. Note that since the sequence of legal identity and type of institution is reversed from the previous example, this superstructure would be useful in planning and management contexts different from the first one.

In these examples only two or three characteristics were included in the superstructure. A state agency could include as many characteristics in the superstructure as would both support decision making and be computationally manageable. The specific set of characteristics to be used and their location in the superstructure must be chosen by the users after careful consideration of the kinds of comparisons most relevant to their planning and management needs.

AGGREGATIONS OF DATA STORED IN THE PCS FORMAT

In addition to uses in conjunction with the kinds of superstructures discussed above, one of the principal statewide uses of the PCS is to allow the collection, aggregation, and analysis of information regarding programs and activities conducted within institutions and learning centers in a state. For example, when evaluating a request to initiate a new program in biochemistry, a state agency may want information on all biochemistry programs in the state (and possibly other states). This information would be available from the institutions in the state and could be located in a state-level information structure that incorporated the PCS. It is beyond the scope of this paper to outline all the possible ways that data stored in the PCS format might be aggregated or compared at the state level; however, three examples have been developed to illustrate some of the possibilities.

Figure 10 illustrates a typical comparison procedure that follows the hierarchy of the PCS. It involves the collection and reporting of a set of program measures (such as enrollments and expenditures) associated with the biochemistry instruction programs at two institutions so they can be compared at the state level.

Figure 11 shows that the hierarchy of the PCS need not be a limiting factor in obtaining data organized according to its structure. In this example, upper division instruction, regardless of subject matter, is the activity of interest, and aggregations of enrollment measures (for example, headcount enrollments) and financial measures (for example, total direct expenditures, faculty salary) for two institutions are desired.

These program measures related to upper division instruction will have to be aggregated across all of the discipline categories for the two institutions in question prior to comparing them. The discipline categories used in the Higher Education General Information Survey (HEGIS) have proved useful for this. As indicated previously, simple aggregations of some measures, such as enrollments, may be misleading and inappropriate in some contexts, and careful consideration should be given to the possibility of double counting and similar problems. Moreover, simply because some kinds of information are available in PCS format does not mean they are useful or meaningful in the context of state-level concerns. This, too, is a matter that should receive serious attention before data collection efforts are initiated.

Figure 11. ILLUSTRATION OF A PROCEDURE FOR AGGREGATING PROGRAM MEASURES ASSOCIATED WITH UPPER DIVISION INSTRUCTION AT TWO INSTITUTIONS USING THE PCS

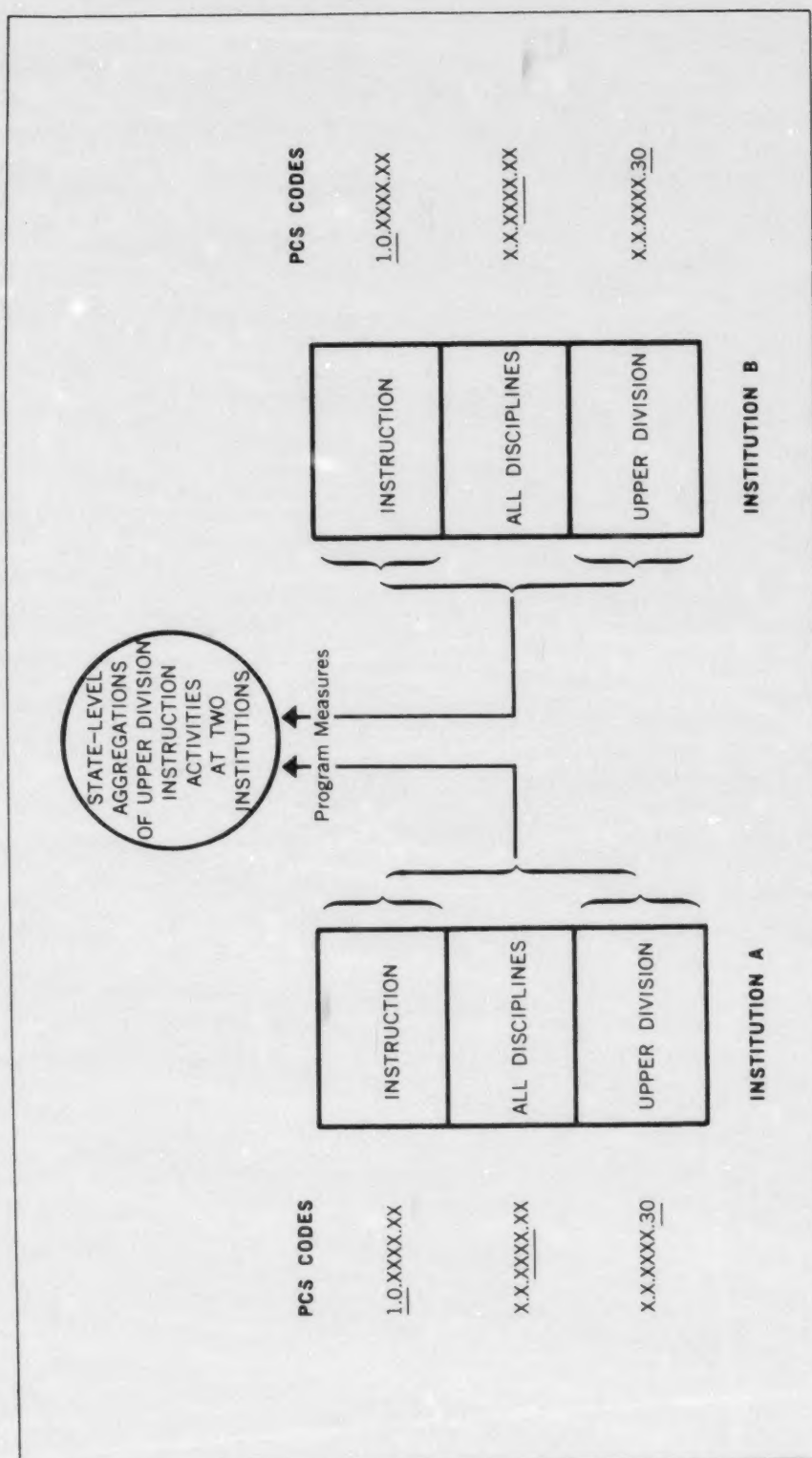
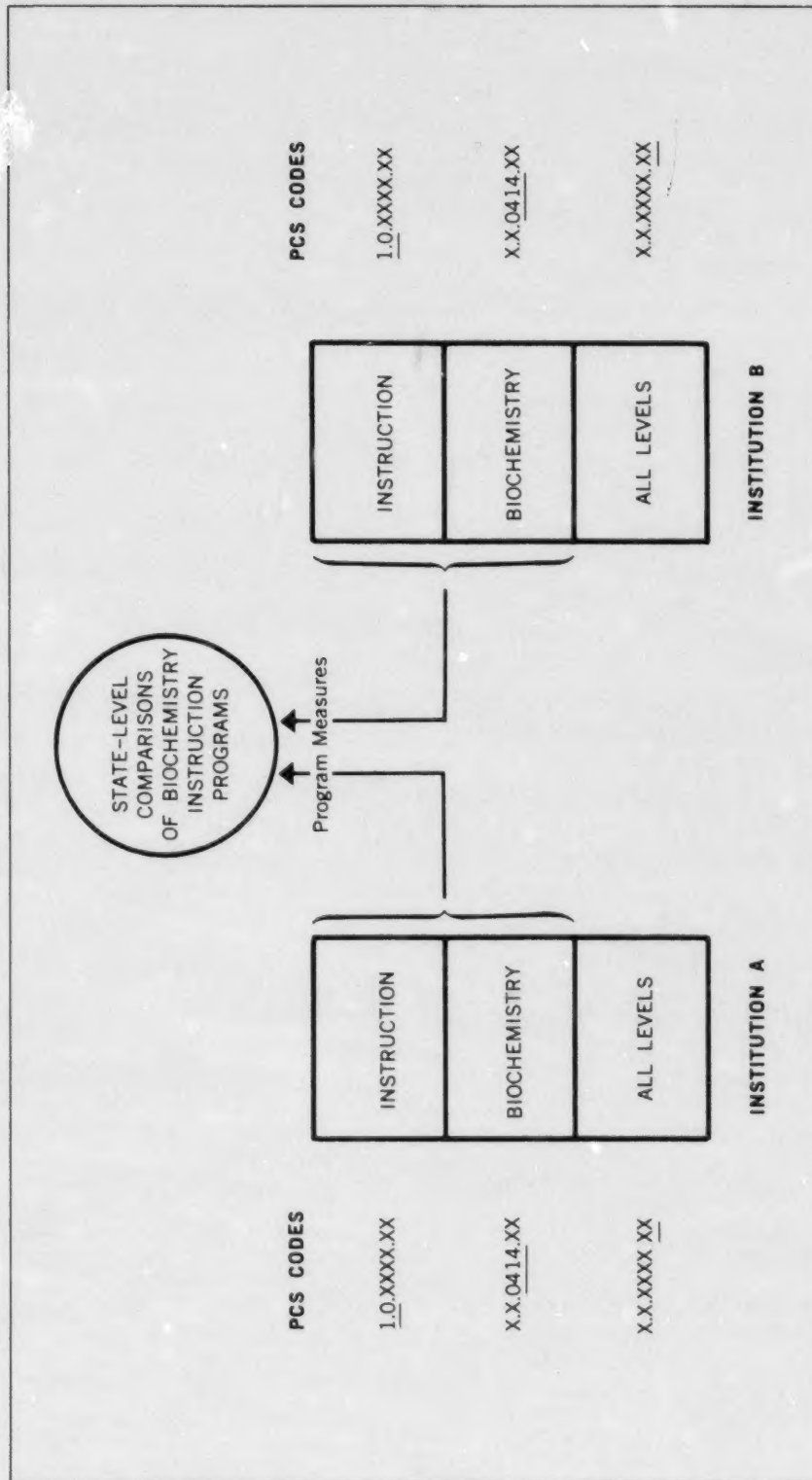


Figure 10. ILLUSTRATION OF A PROCEDURE FOR COMPARING PROGRAM MEASURES ASSOCIATED WITH BIOCHEMISTRY INSTRUCTION AT TWO INSTITUTIONS USING THE PCS



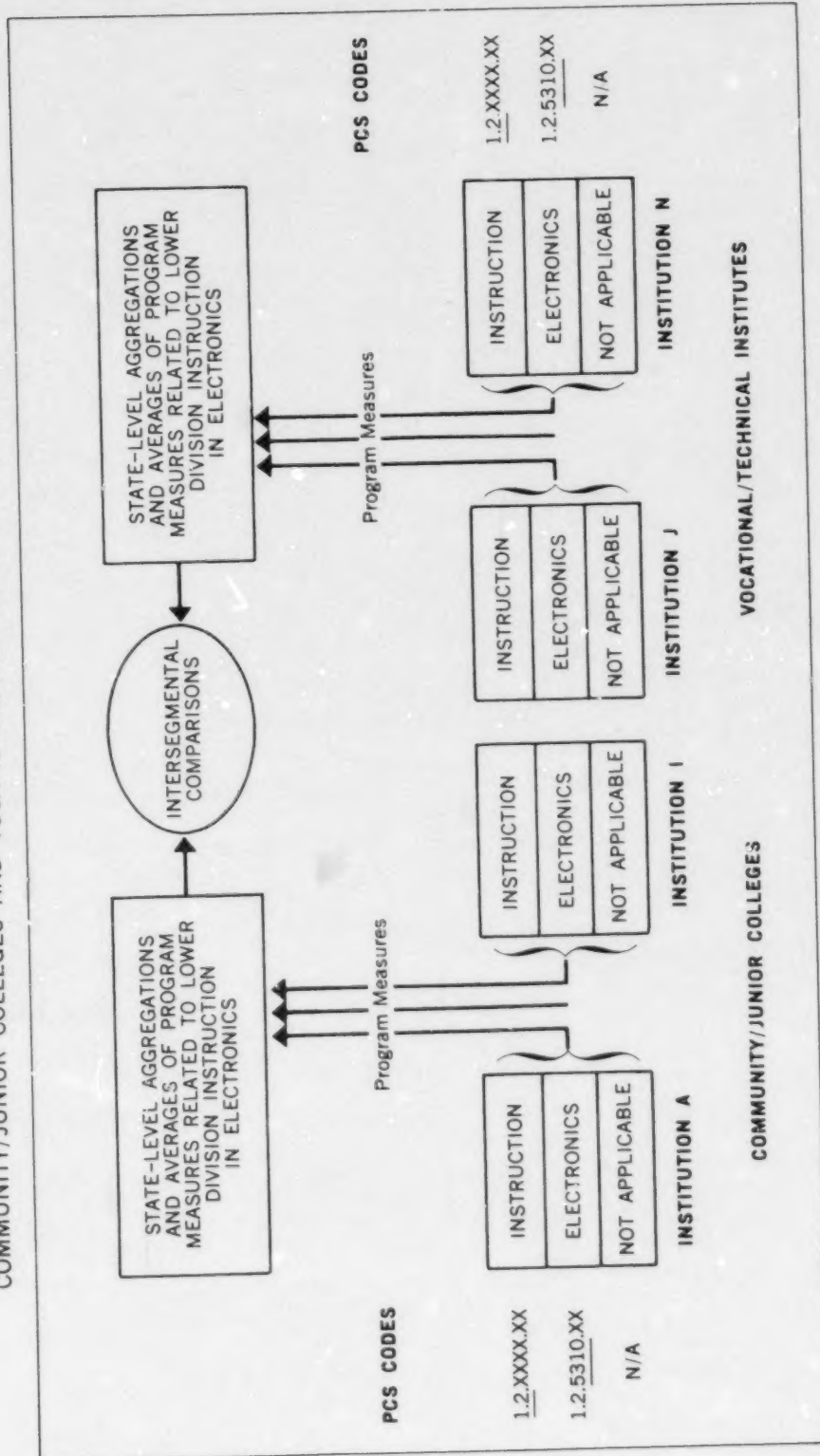
A somewhat more complex example is illustrated in Figure 12. In this example program measures associated with instruction in electronics are aggregated separately for the two-year colleges and vocational/technical institutes in a state. These aggregations then are transformed into averages for the two types of institutions so they can be compared at the state level.

The kinds of program measures that might be aggregated in this example are student enrollments and total direct expenditures for electronics instruction. These could be transformed into average expenditures per student which could be compared for the two types of institutions. The next step in the analysis would be to determine the factors that are important in explaining the observed differences in the expenditure per student figures for the two types of institutions. Some of the institutional characteristics discussed previously (for example, legal identity) might enter into the analysis at this point.

A number of important points should to be emphasized regarding these kinds of aggregations and comparisons:

- In order to be able to obtain the kinds of data to support the aggregations and comparisons illustrated, institutions in the state must either collect data in the PCS format or be capable of transcribing their information into PCS format.

Figure 12. ILLUSTRATION OF A PROCEDURE FOR AGGREGATING AND COMPARING PROGRAM MEASURES ASSOCIATED WITH INSTRUCTION IN ELECTRONICS FOR COMMUNITY/JUNIOR COLLEGES AND VOCATIONAL/TECHNICAL INSTITUTES USING THE PCS



- It may not be appropriate to perform all possible data aggregations of this type at the state level routinely, or even at all. Even though a total structure incorporating the PCS may facilitate the construction of a large number of aggregations, state-level use of such aggregations may be misleading or not even useful.

- The use of these kinds of procedures and information should not be restricted solely to state-level agencies involved with postsecondary education. Other agencies, both national- and state-level, as well as individual institutions/learning centers and organizations representing them, also should find the kinds of comparative data that can be provided by these procedures and structures to be relevant to their planning and management problems.

- The need to search for explanations of differences in program measures that might be detected using the procedures discussed above should not be overlooked. It would be inappropriate, for example, to take differences in expenditures per student at face value without attempting to determine why the differences have occurred. The fact that one institution has lower expenditures per student than another can be explained in a number of ways (for example, it may be more efficient, or it may use more teaching assistants, or a keypunch operator may have made an error). It is beyond the scope of this report to discuss this problem in detail, but readers should be aware of the need for follow-up analysis on the kinds of comparisons suggested above.

EXTENDING THE PCS TO POSTSECONDARY EDUCATION

Because of growing interest at the state level in the relationships between "traditional" higher education (that is, college and university activities and programs) and other kinds of postsecondary education (for example, vocational/technical, adult/continuing, open university), it is appropriate to discuss briefly how the PCS might be applied in a broader postsecondary education context. In fact, since the four-year colleges and universities seem to be becoming more involved in vocational, occupational, and adult/continuing education programs, they should find this discussion on extensions of the PCS to be of interest.

To encompass all of postsecondary education successfully, a classification structure must be able to deal with the variety of program contents, delivery systems, and target audiences from a single frame of reference. For example, the list of potential users would include vocational/technical institutes, adult/continuing education programs, and proprietary institutions in addition to its current users, the four-year colleges, universities, and community/junior colleges.

Initially, it appears that the various segments of postsecondary education have enough in common to permit their inclusion in the basic framework provided by the PCS. The basic programs and overall structure of the PCS seem quite appropriate for all of the types of institutions identified above. This does not mean that the PCS would be acceptable to all postsecondary education users without some modification. It does appear,

however, that by modifying it in two ways, the relevance of the PCS to the broad range of postsecondary education institutions and agencies can be improved substantially. The following paragraphs describe two specific modifications to the PCS that would make it more appropriate as a classification structure for all of postsecondary education.

The first of the major difficulties in the current PCS that must be overcome is related directly to the inadequacy of the 5000-5500 series of the Taxonomy of Instructional Programs in Higher Education (Huff and Chandler, 1970) in describing the content of different vocational and occupational activities and programs. Not only is the 5000 series inadequate in terms of content, but also federal reporting requirements for a majority of vocational/technical education programs are based on a second taxonomy of subject matter areas (Putnam and Chismore, 1970), which is often referred to as the Handbook VI taxonomy. A single, unified taxonomy, free of the kinds of limitations existing in current taxonomies, is needed to make the PCS a more viable alternative for all of postsecondary education.

The second major difficulty in the current PCS is related to the fact that instruction programs are classified in three different areas. Regular instruction activities such as credit courses and programs are included in the Instruction Program (1.0); noncredit courses are included in the Community Education Subprogram (3.1); and remedial and compensatory courses are included in the Supplementary Education Service Subprogram (5.2). This scattering of instruction programs throughout the PCS presents

some problems for traditional higher education, and it creates special problems for some kinds of postsecondary education institutions, particularly those that have adult/continuing education programs. There are two major reasons for this:

1. For many types of institutions the distinctions between credit and noncredit (remedial and regular) courses are of importance primarily to the students taking the courses and not to the departments offering the courses. This suggests that in terms of the PCS (which deals with institutional/discipline programs) the credit status or remedial status of courses or departments should not be reflected in the structure.
2. One of the places in which these distinctions are used is in the budgeting process. Very often the amount of state funding for a course or program will depend on where it falls in the PCS. For example, in some states only credit courses receive state support; noncredit courses are expected to be self-supporting.

The current organization of instructional programs in the PCS does engender the mixing together of philosophical and funding questions that appropriately would be kept separate. It would be more appropriate to design a structure into which different users will classify the same activities into the same categories, without regard for the funding implications of the structure.

If these two major adjustments could be made in the PCS (that is, incorporating a unified postsecondary education subject matter taxonomy and consolidating all the instruction activities), it should be possible to extend the applicability of the PCS to a broader postsecondary education constituency while at the same time maintaining, or even enhancing, its utility to "traditional" higher education. If this could be done its potential value to state agencies would be increased substantially.

SOME GENERAL ISSUES

Several general issues arise concerning the use of the PCS as a partial basis for a statewide information structure. Although they cannot be resolved definitively at this time, they should be emphasized.

1. *What kinds of information are required to make different state-level decisions? How much of this information can be obtained by aggregating institutional data and program measures that may be organized in the PCS format?*

The answers to these questions depend on the nature of the decisions and objectives of the involved organizations. Each decision must be examined to determine the kinds of information required for both adequate understanding of the surrounding issues and identification of legitimate domains of interest for the state agencies. These then must be related to the kinds of information and aggregations available from the information structure.

One of the objectives of the NCHEMS Statewide Analysis project is to examine specific problems, issues, and policy questions to determine in explicit terms the kinds of data required to address them.

The efforts in this project should provide additional insights into the kinds of information and structures necessary and appropriate at the state level. They may reveal also that certain aggregations are more relevant to important problems and decisions than others.

This could be used to suggest or specify criteria and procedures for aggregating information for different statewide uses.

2. *What are the implications of a state-level information structure for the locus of decision-making responsibility in a state? Will adding such a structure lead to more state-level involvement at lower levels of concern? Will it lead to more centralization?*

It is important to note that state agencies probably have a legitimate right to any institutional data at any level that could help them address important decisions and policy questions, particularly if they provide financial support to the institution. This certainly does not mean, however, that they ought to, or would even want to, obtain the most detailed data available on a routine basis. Determination of the most appropriate information and associated level of detail is a matter that should, if possible, be determined jointly by the agencies and institutions concerned, based on their respective needs and capabilities. Needless to say, the final location of the

"boundary" between institutional and state-level responsibilities will vary from state to state. It is important to remember that the locus of decision-making responsibility is not a simple function of size or any other single criterion, and for every rule of thumb that one can propose, there probably will be several exceptions among the fifty states.

Two considerations should be kept in mind in any attempt to address this important issue. First, if a statewide agency becomes involved in too much detail in its planning and management activities, it may get bogged down in the processing and handling of data and may have insufficient resources to analyze and interpret the data effectively. Second, any time a state agency assumes a responsibility from an institution, there is likely to follow an erosion of the ability of the institution to articulate and define its own positions, objectives, and plans effectively.

SUMMARY AND CONCLUSIONS

Given the growing needs and demands of state-level agencies for compatible and comparable information about postsecondary education programs, there is a growing need for some kind of uniform information structure, such as the one suggested in Figure 5, which includes the NCHEMS Program Classification Structure. Without such a structure, it is very difficult to make the kinds of comparisons of programs, delivery systems, curricula, and so forth that are essential for adequate statewide postsecondary education planning and decision making. This is not to imply that the existence of such a classification structure would guarantee improved planning and decision making, but, without such an information structure, the development of management tools and skills is likely to be delayed and made more difficult.

This document has focused on: state-level information structures that include the PCS, a variety of illustrations of possible procedures for aggregating data organized in the PCS format, the relationships between institutional/discipline program structures and student/degree program structures, some of the consequences and implications for state-level decision making of using an information structure based on the PCS, and the major problems in the PCS that must be dealt with to make it more relevant to the needs of postsecondary education.

Everything considered, the PCS, with appropriate extensions and modifications holds considerable promise as a basic structure for describing

postsecondary education discipline programs, from courses and course levels up to state level aggregations and totals. It could be used in a number of contexts as a basis for collecting, aggregating, and reporting information about postsecondary education delivery systems, though it should not be adopted or used at the state level uncritically. Individuals in each state, in the last analysis, must determine whether the kinds of information provided through the use of the PCS are useful and appropriate at the state level. To assist in this determination, this document has presented not only several possible applications but also many of the consequences and implications that should be considered.

APPENDIX
THE INDUCED COURSE LOAD MATRIX

THE INDUCED COURSE LOAD MATRIX

The instructional portions of both institutional/discipline programs and student/degree programs have individual courses (for example, English 101) as common elements. The Induced Course Load Matrix is a tool that permits the linkages between these two types of programs to be represented in quantitative terms, based on the numbers of courses in the different institutional/discipline programs taken by students in the different student/degree programs at a particular institution.

An Induced Course Load Matrix (ICLM) represents the average credit hour load in each discipline and course level generated by a full-time equivalent (FTE) student major in each student program and student level. The ICLM is one of the cornerstone concepts for the development of direct (or full) costs per FTE student major by student program and student level. It defines the relationships between degree programs and the institutional/discipline programs that provide instruction to students.

To build a historical ICLM, a historical Instructional Work Load Matrix (IWLM) must be prepared. This is done by analyzing student registration records for a specific period of time, counting the number of semester credits taken by each student in each degree program in each instructional discipline or department. Thus, an IWLM for a typical college would look like Figures 13 and 14. In this hypothetical example, an analysis of student records for a single semester indicated that the 74 lower

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FIGURE 13. INSTRUCTIONAL WORK LOAD MATRIX
LOWER DIVISION STUDENT/DEGREE
PROGRAMS FOR A SINGLE SEMESTER

Disciplines			Student/Degree Programs									
			History	English	Biology	Chemistry	Physics	Elem. Edu.	Business	Undecided Sci./Math	Undecided Humanities	Totals
Name		Codes										
LOWER DIVISION DISCIPLINES	History	1.1.2205.20	259	162	63	32	21	224	96	74	148	1079
	English	1.1.1501.20	207	203	63	48	32	336	96	111	170	1266
	Math	1.1.1701.20	111	87	67	80	63	280	128	192	80	1098
	Biology	1.1.0401.20	74	87	63	48	19	168	51	126	80	716
	Botany	1.1.0402.20	15	6	63	6	0	56	6	59	11	222
	Zoology	1.1.0407.20	30	12	84	6	2	56	13	111	16	330
	Chemistry	1.1.1905.20	15	6	42	96	44	0	6	96	5	310
	Physics	1.1.1902.20	0	0	8	35	63	0	0	444	0	150
	Elem. Edu.	1.1.0802.20	74	58	0	0	0	168	0	0	69	369
	Second. Edu.	1.1.0803.20	59	64	42	32	8	0	96	74	58	433
	Phys. Edu.	1.1.0835.20	111	87	63	48	32	168	96	111	80	796
	Accounting	1.1.0502.20	30	0	0	0	0	0	128	0	0	158
	Economics	1.1.2204.20	111	87	63	48	32	168	128	111	80	823
	Marketing	1.1.0509.20	0	0	0	0	0	0	96	0	0	96
		Subtotals		1096	859	621	479	316	1624	940	1109	797
UPPER DIVISION DISCIPLINES	History	1.1.2205.30	15									15
	English	1.1.1501.30		12								12
	Math	1.1.1701.30										0
	Botany	1.1.0402.30			4							4
	Zoology	1.1.0407.30			4							4
	Chemistry	1.1.1905.30										0
	Physics	1.1.1902.30										0
	Elem. Edu.	1.1.0802.30					56					56
	Second. Edu.	1.1.0803.30										0
	Phys. Edu.	1.1.0835.30										0
	Accounting	1.1.0502.30							19			19
	Economics	1.1.2204.30										0
	Marketing	1.1.0509.30										0
		Subtotals		15	12	8	-	-	56	19	-	-
Annual Semester Credit Total			1111	871	629	479	316	1680	959	1109	797	7951
FTE Student Major Enrollments			74	58	47	32	21	111	64	74	53	530

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FIGURE 14. INSTRUCTIONAL WORK LOAD MATRIX
UPPER DIVISION STUDENT/DEGREE
PROGRAMS FOR A SINGLE SEMESTER

Disciplines		Student/Degree Programs									
		History	English	Biology	Chemistry	Elem. Edu.	Business	Second. Edu.	Special Student	Totals	
Name	Codes										
UPPER DIVISION DISCIPLINES	History	1.1.2205.30	713	116	14	4	1	175	39	16	1078
	English	1.1.1501.30	122	639	19	8	1	300	77	17	1183
	Math	1.1.1701.30	0	0	19	59	59	50	39	3	229
	Botany	1.1.0402.30	9	0	197	8	2	38	8	1	263
	Zoology	1.1.0407.30	9	0	216	27	4	25	23	1	305
	Chemistry	1.1.1905.30	0	0	48	289	38	13	0	0	388
	Physics	1.1.1902.30	0	0	38	90	152	0	0	0	280
	Elem. Edu.	1.1.0802.30	113	85	10	0	0	813	0	53	1074
	Second. Edu.	1.1.0803.30	174	200	72	47	11	138	116	44	802
	Phys. Edu	1.1.0835.30	35	15	10	4	4	50	15	1	130.4
	Accounting	1.1.0502.30	9	4	2	0	2	25	231	5	278
	Economics	1.1.2204.30	35	15	10	4	4	75	262	2	407
	Marketing	1.1.0509.30	9	4	0	0	0	0	239	5	257
	Subtotals	1228	1078	655	540	274.4	1702	1049	148	6674.4	
LOWER DIVISION DISCIPLINES	History	1.1.2205.20		15	10	4					29
	English	1.1.1501.20	9		10						19
	Math	1.1.1701.20	9	8	10	8	2	38	15		90
	Biology	1.1.0401.20	17	15	2	4	2	38	8		86
	Botany	1.1.0402.20	9	15	5	4	1	13			47
	Zoology	1.1.0407.20	17	8	10	8	1	13	8		65
	Chemistry	1.1.1905.20			10	8	2	13	15		48
	Physics	1.1.1902.20			10	8	4	13	8		43
	Elem. Edu.	1.1.0802.20							1		1
	Second. Edu.	1.1.0803.20						25	1		26
	Phys. Edu.	1.1.0835.20									0
	Accounting	1.1.0502.20		8		2			15		25
	Economics	1.1.2204.20	171	8		2		25	15		67
	Marketing	1.1.0509.20				1		178	23	1	25
		Subtotals	78	77	67	49	12	178	107	3	571
Annual Semester Credit Total		1306	1155	727	589	286.4	1880	1156	151	7245.4	
FTE Student Major Enrollments		87	77	48	39	19	125	77	10	4821	

division FTE student majors enrolled in the college's history program attempted a total of 259 semester credits in lower division history discipline courses, 207 semester credits in lower division English discipline courses, 111 semester credits in lower division mathematics discipline courses, and so forth. In all, as indicated in Figure 13, lower division FTE student majors in the history program attempted 1111 semester credits.

Once the historical IWLMs have been built, the total number of semester credits taken by all students in each student program at each student level is divided by the respective FTE student major enrollments in those programs. This gives the historical Induced Course Load Matrix. Thus, if the total semester credits shown in Figures 13 and 14 are divided by the total FTE student major enrollments shown at the bottom of the respective columns, the ICLMs shown in Figures 15 and 16 result.

The generation of an ICLM is a tedious, mechanical process. It involves summing semester credits that each student in each degree program at each student level takes in each discipline at each course level, and dividing the result by the FTE student major enrollment of that student program. There are, however, certain subtle conceptual considerations and conventions that must be taken into account during the development of an ICLM to be used for developing compatible student program cost data for exchange and reporting purposes. For example, the following questions should be considered:

FIGURE 15. INDUCED COURSE LOAD MATRIX
LOWER DIVISION STUDENT/DEGREE PROGRAMS

Disciplines		Student/Degree Programs									
		History	English	Biology	Chemistry	Physics	Elem. Edu.	Business	Undecided Sci./Math	Undecided Humanities	Totals
Name	Codes										
LOWER DIVISION DISCIPLINES	History	1.1.2205.20	3.5	2.8	1.5	1.0	1.0	2.0	1.5	1.0	2.8
	English	1.1.1501.20	2.8	2.8	3.5	1.5	1.5	3.0	1.5	1.5	3.2
	Math	1.1.1701.20	1.5	1.5	1.6	2.5	3.0	2.5	2.0	2.6	1.5
	Biology	1.1.0401.20	1.0	1.5	1.5	1.5	0.9	1.5	0.8	1.7	1.5
	Botany	1.1.0402.20	0.2	0.1	1.5	0.2		0.5	0.1	0.8	0.2
	Zoology	1.1.0407.20	0.4	0.2	2.0	0.2	0.1	0.5	0.2	1.5	0.3
	Chemistry	1.1.1905.20	0.2	0.1	1.0	3.0	2.1		0.1	1.3	0.1
	Physics	1.1.1902.20			0.2	1.1	3.0			0.6	
	Elem. Edu.	1.1.0802.20	1.0	1.0				1.5			1.3
	Second. Edu.	1.1.0803.20	0.8	1.1	1.0	1.0	0.4		1.5	1.0	1.1
	Phys. Edu.	1.1.0835.20	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Accounting	1.1.0502.20	0.4						2.0		
	Economics	1.1.2204.20	1.5	1.5	1.5	1.5	1.5	1.5	2.0	1.5	1.5
	Marketing	1.1.0509.20							1.5		
UPPER DIVISION DISCIPLINES	History	1.1.2205.30	0.2								
	English	1.1.1501.30		0.2							
	Math	1.1.1701.30									
	Botany	1.1.0402.30			0.1						
	Zoology	1.1.0407.30			0.1						
	Chemistry	1.1.1905.30									
	Physics	1.1.1902.30									
	Elem. Edu.	1.1.0802.30						0.5			
	Second. Edu.	1.1.0803.30									
	Phys. Edu.	1.1.0835.30									
	Accounting	1.1.0502.30									
	Economics	1.1.2204.30							0.3		
	Marketing	1.1.0509.30									

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FIGURE 16. INDUCED COURSE LOAD MATRIX
UPPER DIVISION STUDENT/DEGREE PROGRAMS

Disciplines		Student/Degree Programs									
		History	English	Biology	Chemistry	Elem. Edu.	Bus. Iness	Second. Edu.	Spec. Ed. Student		
Name	Codes										
UPPER DIVISION DISCIPLINES	History	1.1.2205.30	8.2	1.5	0.3	0.1	.05	1.4	0.5	1.6	
	English	1.1.1501.30	1.4	8.3	0.4	0.2	.03	2.4	1.0	1.7	
	Math	1.1.1701.30			0.4	1.5	3.1	0.4	0.5	0.3	
	Botany	1.1.0402.30	0.1		4.1	0.2	0.1	0.3	0.1	0.1	
	Zoology	1.1.0407.30	0.1		4.5	0.7	0.2	0.2	0.3	0.1	
	Chemistry	1.1.1905.30			1.0	7.4	2.0	0.1			
	Physics	1.1.1902.30			0.8	2.3	8.0				
	Elem. Edu.	1.1.0802.30	1.3	1.1	0.2			6.5		5.3	
	Second. Edu.	1.1.0803.30	2.0	2.6	1.5	1.2	0.6	1.1	1.5	4.4	
	Phys. Edu.	1.1.0835.30	0.4	0.2	0.2	0.1	.02	0.4	0.2	0.1	
	Accounting	1.1.0502.30	0.1	.05	.05		0.1	0.2	3.0	0.5	
	Economics	1.1.2204.30	0.4	0.2	.2	0.1	0.2	0.6	3.4	0.2	
	Marketing	1.1.0509.30	0.1	.05					3.1	0.5	
LOWER DIVISION DISCIPLINES	History	1.1.2205.20		0.2	0.2	0.1					
	English	1.1.1501.20	0.1		0.2						
	Math	1.1.1701.20	0.1	0.1	0.2	0.2	0.1	0.3	0.2		
	Biology	1.1.0401.20	0.2	0.2	.50	0.1	0.1	0.3	0.1		
	Botany	1.1.0402.20	0.1	0.2	0.1	0.1	.05	0.1			
	Zoology	1.1.0407.20	0.2	0.1	0.2	0.2	.04	0.1	0.1		
	Chemistry	1.1.1905.20			0.2	0.2	0.1	0.1	0.2		
	Physics	1.1.1902.20			0.2	0.2	0.1	0.1	0.1		
	Elem. Edu.	1.1.0802.20								0.5	
	Second. Edu.	1.1.0803.20						0.2		0.5	
	Phys. Edu.	1.1.0835.20									
	Accounting	1.1.0502.20		0.1		.04			0.2		
	Economics	1.1.2204.20	0.2	0.1		.04	.04	.01	0.2	0.2	
	Marketing	1.1.0509.20				.02			0.3	0.1	

1. What unit of measure is to be used to create the IWLM? Current NCHEMS products use the semester credit or an equivalent thereof.
2. What unit of measure is to be used to convert the IWLM to the ICLM? FTE student major is commonly used.
3. To what period of time do the IWLM and ICLM correspond? Academic term? Academic year? Calendar year? Fiscal year?
4. What course levels are to be included?
5. What student levels are to be included?
6. At what level of detail are the disciplines and student major to be displayed?

One might ask whether it is necessary to go to the trouble of setting up an ICLM. Since degree programs typically have the same names as departments, would not the same information structures suffice for both?

Unfortunately, student/degree programs are less uniform across institutions than are the disciplines for which they may be named; degree programs in different institutions may have widely different content and curricula. This is true particularly in the broad context of postsecondary education. To the extent that such differences exist, it is essential to reflect them in any standard reporting system about degree programs, and one of the most effective means for doing this is to use an ICLM. This permits the individual student and degree programs to be described relatively easily, accurately, and completely.

Certainly, this may place a substantial burden on a state agency that desires information about student/degree programs offered by the institutions in a state, since at least the column of the ICLM corresponding to the degree program plus any other statistics of interest (such as enrollments and degrees awarded) must be provided for each degree program of interest. However, without all of this information a state agency runs the very real risk of making comparisons of student/degree programs that may be substantially different even though they may have the same name.

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